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Square, now the accepted "center" of the New York art world. Within this romantic atmosphere progress should be easy; and very convenient are the "small Bohemian restaurants" where the students can gather for their repast without removing their paint-covered smocks—so runs the catalogue of the modern school. In this, the most extreme of New York art schools, Mr. W. Reiss is conducting a class in poster designing according to the most modern European ideas. An interesting feature is a class where, upon the payment of a small sum, the student can spend his afternoons drawing from the nude. The Sculpture Class receives criticisms from Miss Florence Lucius, and Mr. William Zorach directs the other groups.

The beforementioned Art Schools are devoted solely to the study of High Art but for students who are obliged to earn their living the New York School of Fine and Applied Art offers the most practical training. Here there are classes in Poster Painting and in the designing of costumes and hats, etc. If the dictum of Oscar Wilde holds true that nothing that is useful is beautiful and therefore that all real art must be useless, one will have to discard the work of these students, who make clever cover-designs for *Vogue* and *Vanity Fair.* But it must be remembered that owing to the same rule one would also have to discard the beautiful Attic vases with their marvelous figures in pale amber silhouettes against polished black and red backgrounds. These vases were undoubtedly as useful in their time in Athens 400 B. C. as receptacles of oil and wine as our modern monstrosities of that ilk in ours. Yet their past usefulness does not in the slightest impair their present graceful shape or the superb rhythmic line of the nude bodies of the classic Greek youths that decorate their sides. Yet one must admit that it is necessary to blush when comparing a Greek vase with a clever cover design for a modern magazine.

The Cooper Union founded by Peter Cooper also offers chances of practical study in mural decoration and in ornamental modeling, but it must be confessed that this school, along with the National Academy of Design, produces the sort of student who remains a student for the rest of his life, still plodding on from year to year drawing in a hard stiff manner and becoming at last nearly as useless as the fossil of an antedeluvian beast in the Museum of Natural History. The fetid atmosphere of these two schools is probably as old as Methuselah and the present ventilation is not much better than that of his day. The Pratt Institute is so well known as a place of practical torture, where the student may learn art in a perfectly mechanical system, that there is hardly any need of giving it special notice. To conclude, we may quote the pious litany of a fellow painter who was sentenced to study in the two last mentioned schools. He told the writer that he murmured every night on bended knees the following prayer: "From the National Academy of Design, from the Pratt Institute and from the Cooper Union: *good Lord deliver us.*"

*Theodore Lynch Fitz Simons*

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# THE GEOMETRIC BASIS OF PICTORIAL ART

By K. H. de Haas

That the arts are subject to rules and restrictions is a truth to both artists and laymen. However, one exception is generally made, and that exception is the free art of painting and drawing. Is not the very title of this article "The Geometric Basis of Pictorial Art" opposed to the conception that most painters and critics have of the nature of pictorial art? And yet there is nothing more erroneous than the belief that the so-called free art of painting and drawing is free in regard to the composition of the subject matter.

As an example to illustrate my statement that geometry is basic to pictorial art, I select Rubens's "The Descent from the Cross," which was the subject of Mr. F. Wellington Ruckstuhl's article in the November number of this magazine and which is again reproduced in this issue (page 437).

Before we analyze the foundation of the composition of this masterpiece of Rubens, let us first study the proportions of the panel on which Rubens painted this work "of sublime beauty" as Mr. Ruckstuhl describes it.

Fig. 1 shows a circle, the periphery of which has been divided into twelve equal parts. Each of the twelve points dividing the periphery is connected by a straight line with each of the other points, and there results a regular dodecagon with all its diagonals.

We have drawn with heavier lines the oblong that is included between four of the diagonals, and that has the shape of Rubens's painting. It is evident that the angle of 15 degrees is dominant between every two lines in the dodecagon, or in other words: 15 degrees is the arithmetical mean of all the angles in this linear division of the circle.

Fig. 2 shows the same oblong that is drawn with heavier lines in Fig. 1, but now enlarged to the same size as the reproduction of Rubens's painting, so that it can be compared with it. The lines that are drawn through it are the diagonals of the dodecagon in so far as they pass through the oblong. We have now arrived at the geometrical basis that underlies Rubens's composition; for, if we place the sheet with the F line-figure, 2, on top of the reproduction, we see how the basic lines in Rubens's composition coincide with the lines in Fig. 2. *Note* 1.

The very center of the dodecagon (Fig. 1) has become in Rubens's picture the point on which his figures pivot.

Compare for instance the distances from the eyes of the opposed figures to Christ's shoulder, as a center. Note how the distance from Christ's outstretched hand to this shoulder is equal to the distance from His foot to this shoulder. Mark, above

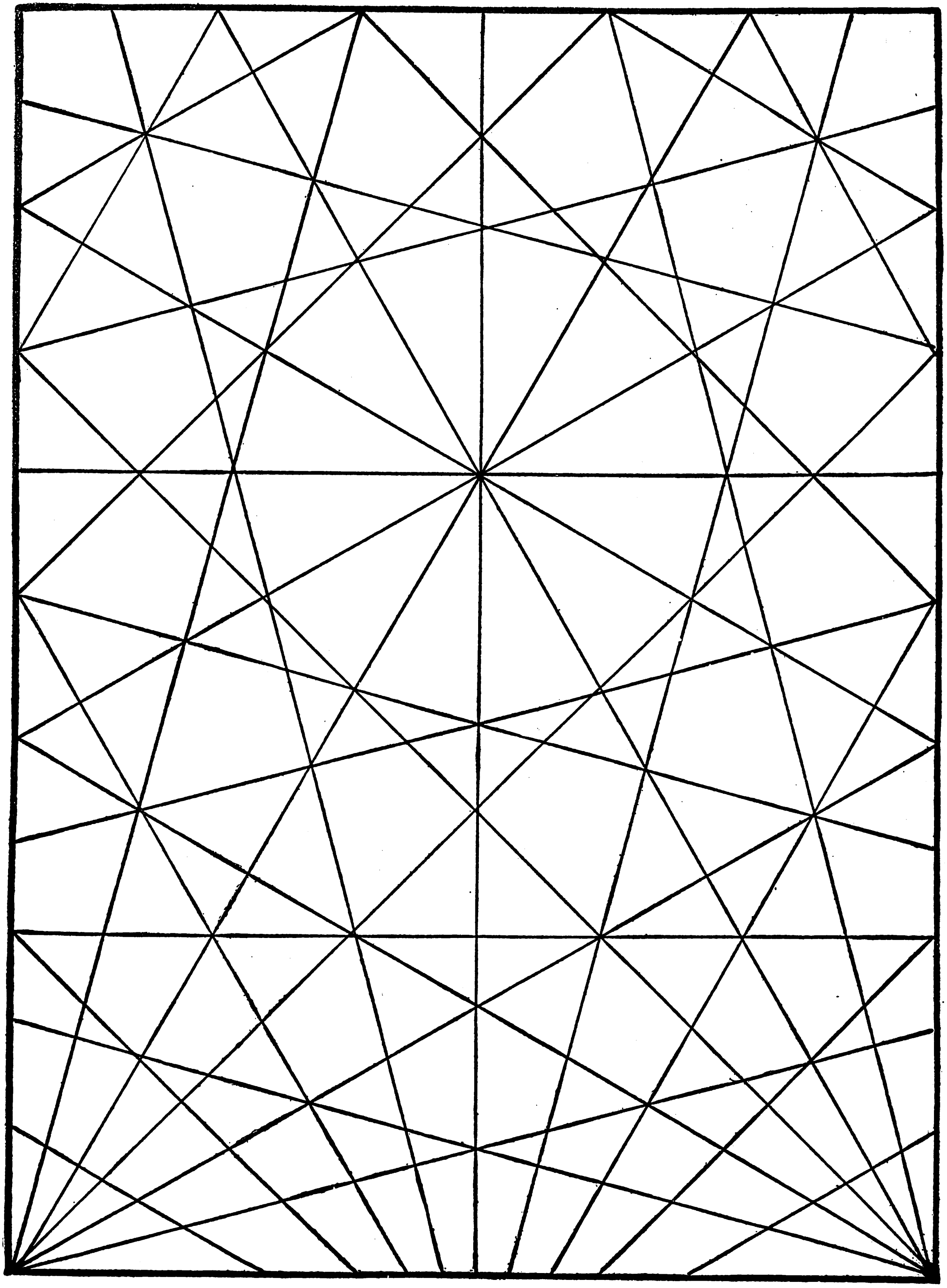
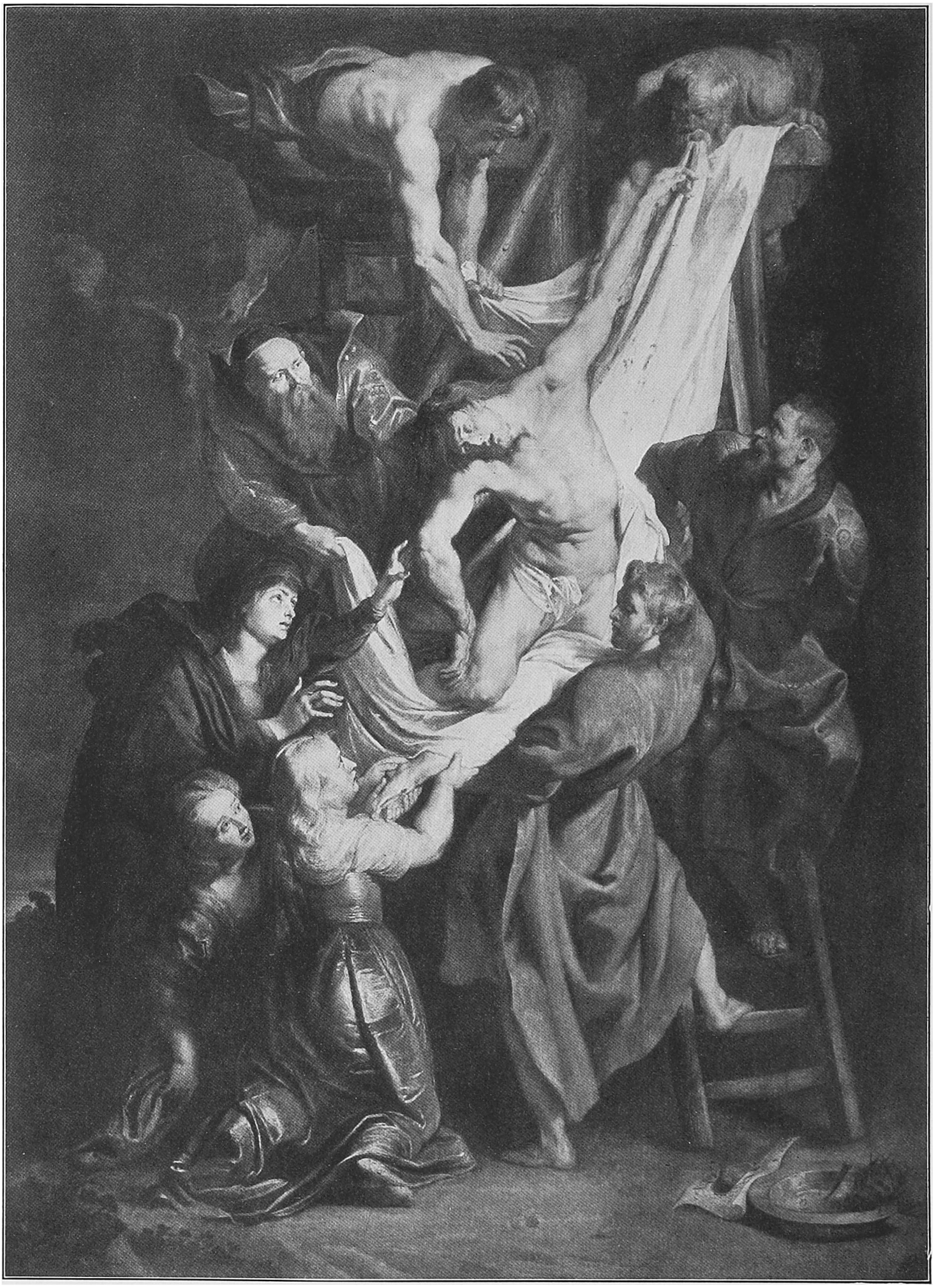


FIG. 2.



"THE DESCENT FROM THE CROSS"

BY RUBENS

all, how Christ's head, the most important detail of the whole subject-matter, is, as it were, supported by this geometrical nucleus. Note also, that if we place the sheet F with Fig. 2 top-downwards over the reproduction, this same nucleus props the hand that supports Christ's leg. See how the hand above Christ's head leans, as it were, on the horizontal line that, with the base of the oblong and with the respective parts of the standing sides of the oblong forms a square. This means that the distance from the hand to the base of the painting equals the width of the painting; or in other words that this hand marks off the shorter dimension of the painting on the longer dimension and thus makes us feel the rhythm of their proportion. Mark, after replacing the sheet with Fig. 2 again in its first position, how the whole division of light and dark follows the lines of Fig. 2, which means, that the boundaries between light and dark form angles of 15 degrees or multiples of 15 degrees P, which was also the case, as we have seen, with the diagonals in the dodecagon.

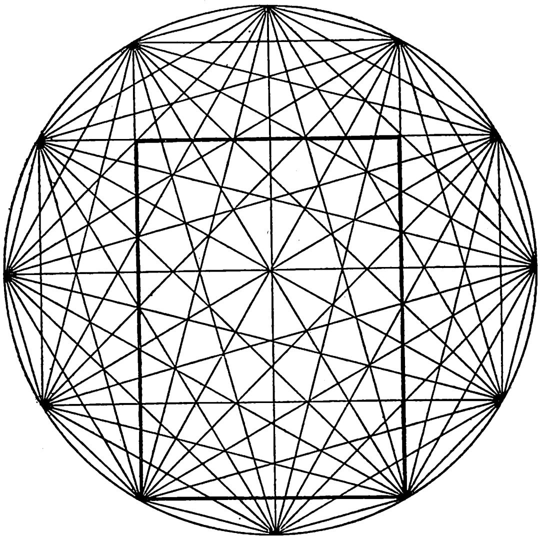


FIG. 1.

With reference to the proportions of this Rubens panel it can be stated that canvases of this shape have been used by many of the great artists—Rembrandt, Memlinc, Leonardo and others—who feeling (or knowing?) the importance of its nucleus, accented the vital features (as the eye or the mouth in a portrait) by means of it. That some of the modern masters and critics are not unsensitive to the beauty of composition based on geometrical figures can hardly be proven more clearly than in the case of Renoir's "Baigneuses" (1885) and the eulogy on it by Mr. Willard Huntington Wright in his "Modern Painting." It is remarkable that one can elaborate on the lines in this composition without observing the linear geometrical scaffolding on which this picture is built, and which, but for an insignificant variation, is the same as the one that underlies Rubens's masterpiece.

That the proportions of Rubens's panel contain, from their very origin, decided rhythmical elements, can be demonstrated geometrically by constructing an oblong of these proportions, as follows:

Fig. 3. Describe around point O two concentric circles, the one with radius R, the other with radius 2R. The rectangle that is circumscribed about the smaller circle (3 sides tangent) while inscribed in the larger circle, is similar to Rubens's panel. *Note* 2.

Now we must remember that we constructed the smaller circle with the radius R. This means that the line *oa* equals *R times the square root of* 1, from which we can easily prove that the line *ob* equals *R times the square root of* 2.

The line *oc* equals *R times the square root of* 3.

The line *od* equals *R times the square root of* 4.

In other words the squares of the distances from the point O to the sides and to the corners of the oblong are in the ratio 1:2:3:4. The position of the point O on the canvas gives rise to rhythm that can be expressed by the arithmetical progression, 1:2:3:4. The very fact that the artists who used canvases of the proportions of this oblong, accentuated this rhythmical point on the canvas in their compositions, goes to prove that their sense of rhythm found satisfaction in the geometrical rhythm of the canvas, and the fact that art-lovers have a preference for pictures of which the basic composition is in harmony with the geometrical elements of the canvas, supports the statement that geometry is basic to pictorial art. Comparative study of the geometrical elements in the composition of the paintings of different schools of all ages, would show that the pictures of the periods when the geometrical elements in the composition were stronger, are considered to be of a higher order than the pictures of the periods with a lessened sense for the geometrical foundation of composition.

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For those who are interested in this subject I wish to state that the idea of a necessary geometrical foundation of the composition of paintings belongs to W. A. van Konijnenburg, who has explained his ideas in a recently published work: "De Æsthetische Idee" (The Æsthetic Idea) pub-

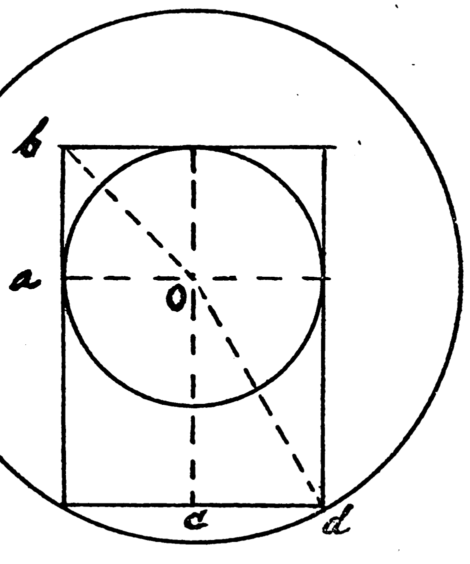

FIG. 3.

lished by Mouton & Co., The Hague, Holland, 1916. Notwithstanding the fact that this unusually interesting book is written in Dutch, its contents would undoubtedly be of great value to the American student of Æsthetics, since he could in some measure understand the author by studying the many illustrations which are made by Van Konijnenburg himself and which closely follow the text. Van Konijnenburg calls attention to the regular geometrical figure and the forms derived therefrom, as the basis of composition in all the plastic arts, including the free arts of drawing and painting, and he elaborates particularly on the inevitable relation between the geometrical basis of a composition and the geometrical peculiarities of the plane on which the composition is drawn or painted.

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Note 1:—I wish to say that it is dangerous in studying the basic composition of paintings to depend entirely on reproductions. This can be readily understood when comparing our reproduction of Rubens's "Descent from the Cross" with that in H. Knackfuss's "Kuenstler Monographien" (Rubens, page 17) in which the whole foreground of the painting is cut off, and with the reproduction in Adolph Rosenberg's "P. P. Rubens" (1911) (page 61) which shows the work in a still more mutilated shape. To those who are susceptible to the rhythmical qualities of a composition, such mutilation renders reproductions near to worthless. Another reason why the study of basic composition from reproductions in black and white can at best be very insufficient is, that such reproductions do not always render different tones and color-intensities; so that lines, which in the original painting are formed merely by their being common boundaries of differently colored spots, may not show up in the reproduction. It is evident that, when such lines are missing, the study of the complex of lines and their geometrical relationship becomes rather incomplete.

Note 2:—It was while my article was at the printer's that I saw mentioned for the first time the actual dimensions of Rubens's "The Descent from the Cress."

This was in the work on P. P. Rubens by Adolph Rosenberg, who gives them as high 4.20 meters and wide 3.10 meters.

In applying to these proportions the formula of which my article treats, I find that a height of 4.23 meters would exactly fit to a width of 3.10 meters.

Although I am inclined to take all measurements of paintings in catalogues as only more or less approximately exact, I think that the trifling difference of 3 centimeters (1 inch) on a total length of 420 centimeters (a difference of ¾ of 1%) might be easily accounted for as shrinkage of the wood of the panel during the 300 years since the painting was made (1611-1614).

*K. H. de Haas*